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SCIENTIFIC EDUCATION[1]

By WILLARD F. LIBBY

Commissioner, U. S. Atomic Energy Commission

SCIENTIFIC EDUCATION seems to have arrived at a critical stage in which, apparently, it is not obvious to the young student that science is a desirable and fruitful career. At least it seems clear from the statistics of enrollment that a large fraction of our ablest students do not choose to become scientists. The reality of the shortage is unquestioned, but one is tempted to feel that it is a low due to the decrease in birth rate during the depression. This thought is quickly dispelled, however, when the numbers are converted to percentages. Science and engineering are less popular on a *relative* basis.

When we contemplate the significance of this fact, a chill runs through us which almost arrests rational thought. We can hope that somehow or other there will be new trends in the numbers, that the present dismal prospects are ephemeral in character, and that when we consider these matters tomorrow or next year the prospects will be happier. It is by no means obvious that this is so, however, and that there are not basic underlying causes for the present low percentages of enrollment in physics and chemistry. We can fruitfully consider whether there are not ways in which this discouraging trend in our classrooms and laboratories can be reversed.

Many of us today remember the giants of modern chemistry. They lived and taught us. Much of what we know as chemists came from them directly. Some of them still live among us. The people who discovered the laws of molecular structure and understood for the first time the chemical systematics of nature were our teachers. They gave us the explanations of chemical behavior which have led chemists to understand the words of the mathematical physicist. They

[1] Address at the fall convocation, University of Chicago, Dec. 17, 1954.

saw first that microcosm—the atom—the image of which all of us carry in our minds and all scientists think of in thinking of the ultimate in the structure of matter. With their great experiences fresh they taught with a fervor and insight hardly possible for others. People like Gilbert Lewis were prepared for the theories of Bohr and Born, Heisenberg and Schrödinger, and told us what the deceptively simple language of the theoretical physicists really meant. In so doing they established a cadre of devoted scientists who have made this, our time, the Golden Age of Chemistry. They have spoken the language of the man who takes matters into his own hands to transform it or rather to lead it to transform itself to his own ends and in turn have inspired and taught. We consider today the diminishing effectiveness of this great tradition.

The technological benefits of modern times largely follow from the understanding that basic science is practical and from the principle that invention in itself is not adequate. We have learned that system, bodies of laws underlying the flights of human fantasy and intuition which lead to great discovery, is most essential and effective. The series of advances and discoveries in chemical science that has marked the last two generations is quite the most remarkable in the whole of history. It has been the opening of numberless doors, the discovery of vistas without end in which we see in our everyday lives the practicality, the fruitfulness, and the hope that lie in the efforts of the research scientist. On this background it is difficult to understand the field's being unattractive to brilliant young people.

However, we must try to analyze what seems to be fact and it appears that perhaps first among the causes of our decreased enrollments in the physical sciences may be the stature of the giants of the past generation, our generation. From the point of view of the present-day student, the work of Enrico Fermi, Gilbert Lewis, and men of their calibre makes it seem impossible that he could in any significant way add to the beautiful structure they built. The young physicist may think of the laws of quantum mechanics as worthy of serious research, but after some months of reading he is likely to realize that this field has been most thoroughly searched and does not in any obvious way invite new culture. It is not obvious to the young chemist that the chemical bond is so incompletely understood that he as a young student could make any significant contributions. In thermodynamics, relatively few advances in basic principles have been made during the last several years, though very important and significant new data have been obtained validating and substantiating the laws set down earlier. In chemical kinetics, a wide expanse of green pasture lies before the prospective student, but he also sees this expanse strewn with the bodies of young people from the previous generation who attempted to conquer it. So difficult and so awesome are the problems this field offers that any one, except the young genius, could hardly brave the obvious hazards. In bio-chemistry, by contrast, he finds a great land largely uncharted although very important areas have been mapped. For instance, he can understand that a basic new law or principle remains to be discovered in this field—the principle of life. The thrill of the possibility of such basic discoveries helps attract many able young men into biochemistry. Thus, this field remains one of the strongest and most verdant in science today.

From all of this it is clear that the pickings apparently are not as green for the young student as they were in our school days, and we must put as a prime cause for the present decrease in enrollment in the sciences this fact that they have been so thoroughly and dramatically explored by the greatest men of science the world has known—men who still are with us in spirit and sense and memory. They have set a pattern and stride proper to giants and geniuses but most frightening to ordinary mortals. They have left few obvious opportunities for easy attack and apparently cleared the fields of physics and chemistry, so little undiscovered remains. Of course, one realizes that similar situations apparently have existed before in science and, much to the embarrassment of the prophets of the time, have been shown to be purely temporary in character. In each instance, a few years later new opportunities have been revealed which have greatly increased the scope and range of the particular fields. We can well imagine that this may happen again, but until it does happen we must understand that a young man contemplating studying physics or chemistry looks around

him and observes with considerable discouragement that the obviously important fields are being well tilled. This is unfortunate, for, of course, it is not entirely true. The principle of research is such that it leads to new research, to new investigations and to new queries, to new understanding and to new thought. We cannot imagine that fruitful research will ever lead to a satiation or to an exhaustion or termination of the fields of physics and chemistry. However, it is not obvious to the prospective student that this is so.

We must determine that in our teaching a principal objective will be to present the opportunities for new and fruitful investigation—to reiterate that the life blood of our modern technology is the curiosity and spirit of investigative adventure epitomized in the research man; that it is no accident that many of the leading executives and engineers in industry are Ph.D.'s. We should try to keep before the prospective scientist the great chances of significant new discovery—of learning things fundamental to new knowledge.

Perhaps second in the causes for our low enrollment is the rather unsatisfactory salaries which are paid men of real competence in the sciences. It is clear that there is no real way of repaying with money a research and development man who is really successful. How can you speak of rewarding Fermi for his contributions? Is there any possible way in which Carrothers could have been compensated? How can one think that Faraday could have been adequately and fairly treated in a monetary manner? However, to the students who have to make their way and have debts to pay, the thought that the ceilings to their salaries are likely to be lower than if they chose some other profession is by no means insignificant. It is particularly important for the less gifted of the students contemplating scientific careers who realize that they will never be leaders in their field. They are discouraged from becoming helpers and co-workers because it is clear that the leaders themselves are not well compensated. Of course, the law of supply and demand may correct this situation in the next few years, but the vital question we have to consider is whether we can afford to depend on and wait for this process to occur. It is not obvious that we have any other alternative, but it is probable that the telling of students about the probability of rises in salary standards in the sciences and engineering would lead many who would otherwise be attracted to other professions to give the basic sciences and engineering additional consideration as professions.

SCHOOL *AND* SOCIETY

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Possibly the third most important factor involved in the decreased enrollment in the basic sciences is the quality and quantity of instruction in the secondary schools—more the quantity than the quality. The teachers now teaching sciences in the high schools probably are doing as good a job as their predecessors did but there are relatively fewer of them. A surprisingly large fraction of our high schools—about half, I am told—do not offer courses in chemistry at all. This worrisome situation is difficult to understand. The only simple and obvious solution seems to be that the high-school teachers' salaries be raised. This, however, may by no means be the sole cure needed. Undoubtedly, it is a primary responsibility of the universities to examine and to insist on improvement of this situation. There is no real assurance that anything can be done very quickly, but recognition of the seriousness of the problem would be helpful. Perhaps a solution worthy of serious consideration is the use of the services of technical men otherwise employed in the community on a voluntary part-time basis. In this way at least some basic science could be taught in most high schools.

Lawyers and doctors have for many years been accustomed to assisting in instruction in their specialties in the colleges of the country. The bases for such part-time teaching have been well set in practice and seem to be generally acceptable. It seems possible, therefore, that school principals and boards of superintendents faced with the problem of offering the essential sciences in their curricula might invite resident scientists and engineers in their communities to assist in the technical instruction on a part-time basis. Arrangements could be made so the problems of integration of the student's education could be handled and questions of counselling and discipline would not be neglected. Certainly such arrangements could fill a temporary shortage and might be found to be a more or less permanent solution, for it does not seem likely that high-school teachers' salaries are likely to become in any way competitive with those elsewhere available to trained scientists and engineers. Of course, it might be said that it is not necessary that science be taught by trained scientists or engineers. In view, however, of the great importance of sound understanding of the subject matter to the protection and fostering of interest in the able students, it appears to be desirable that direct contact with practicing technical people might help reverse the present dismal trends.

Perhaps a fourth factor is the quality of instruction in the colleges and universities in the basic sciences. The beginning courses in physics and chemistry are an opportunity to enlist students in the fields. It is of extreme importance that these courses be well taught, that the subject be presented in an interesting and understandable way, not ignoring the basic difficulties but not with such a mass of detail that the beauty of the basic principles is obscured. It is vital that the better teachers in the whole of the university faculties be asked to teach the beginning courses. It is essential that the laboratory experiments used in the instruction be wisely chosen and well equipped so that the ordinary difficulties of experimentation may not mask the attractiveness of the subjects. It is also important that the teacher of the beginning courses in physics or chemistry seriously consider his counselling responsibilities so that students who are interested in the sciences will be encouraged and that the students who are having difficulties of a temporary character will be led to persevere. He should see that the brilliant students be led to pursue the subject matter beyond the general level of the class so that boredom and frustration will not divert them into other fields. The freshman science teacher is certainly one of the vital cogs in the machinery which trains and insures the supply of basic scientists. It is clear at the present time that this job is not being very well done. It is clear that this is one of the principal factors which needs serious consideration in remedying the situation.

No university now offering mediocre introductory courses in the sciences can rest easily. There are excellent and nearly infallible ways of testing the quality of such instruction and no real excuse for ignorance on this point seems to exist. It should be a prime objective of the colleges and universities to discharge their responsibilities to give excellent instruction in these vital fields.

The supply of physicists and chemists will be restored when the problem becomes sufficiently serious to command general attention. But it

seems that the universities have a responsibility to recognize the situation early and to do all in their power to remedy it quickly. All of us should worry much about this problem and try with our best efforts to implement any suggestions for improvement which seem sound and thus protect our society against a manpower shortage of the most critical kind.

More Science Teachers Are Available

By VICTOR A. RAPPORT
Wayne University, Detroit, Mich.

A LONG-DISTANCE telephone call from the head of the research laboratory of a large industrial corporation was, in one sense, the origin of this updating of a fable about a goose and its golden eggs. A voice asked, "May we have your consent to make an offer to Doctor X, who is a member of your physics department?" The question was no surprise: X had told me he was considering the possibility of leaving the academic field.

Despite the obvious courtesy of my caller, my reply was not entirely gracious. His question brought to a quick focus many facts that had lain in my mind in not too ordered a fashion. Manpower specialists deplore the failure to produce enough scientists, and several campaigns are under way to correct this situation. We produce far fewer engineers than are sufficient to fill an increasing demand. I think (and thus it becomes a fact for me) that fundamental research, upon which science rests, is predominantly produced in university laboratories rather than in industrial laboratories. And X was engaged in training future scientists and engineers and in doing original research. Finally, two additional facts bear on the telephone call: first, that academic institutions face an almost impossible task in recruiting teachers for present student bodies (the present is staggering, the future is overwhelming); second, that the financial cost of bringing Professor X through his doctorate was many times in excess of the fees he had paid. His academic institution had been able to subsidize that expensive training through society's generous donations in the form of gifts and taxes, some of which, of course, came from my caller's corporation.

After telling my caller that our standard policy is not to stand in the way of a man who wants to leave, I asked him what his corporation intended to do in return. He was somewhat baffled by this unusual question suddenly flung at him. He must have thought I was suggesting a financial gift to our university ("Strange business, this!"). But the return I was thinking of was not to Wayne University, but rather to the academic world.

I said I thought it would be a fine thing if his corporation would make Doctor X available for one course to the university located in the city where the corporation is domiciled. And perhaps there were one or two other competent men on his staff who could be released a few mornings or afternoons a week to help out the university in particular and science in general. If enlightened self-interest is introduced, these staff members of the industrial laboratory would probably find their value increased by their new association with the men at the university, and, furthermore, the corporation might not in the future have its present difficulty in recruiting scientists and engineers. For these benefits, should not the corporation be happy to furnish to the universities willing staff members without cost to the academic institution? Perhaps the pleasant relations of Wayne with certain Detroit corporations, by which this very thing is done, caused me to suggest it to my distant caller.

The national need suggests that many more corporations could do this with colleges and universities located nearby. One-way traffic from the academic to the industrial world means that the river will dry up at its source; replenishment is essential. Or, to change the metaphor, a fed goose produces more golden eggs than does a dead goose.

An Industrialist Views Industry-College Co-operation[1]

By ADMIRAL BEN MOREELL

Chairman of the Board, Jones & Laughlin Steel Corp.

THE divergences of opinion with respect to all phases of industry-college co-operation are so large that no one can represent with authority the views of *all* of industry, since there is no consensus. In fact, in the light of the high degree of individualism which exists in the steel industry, with which I am connected, it would be a brave man, indeed, who would dare to speak for that industry alone or even for my own corporation. I find myself reduced, therefore, to the somewhat innocuous position of speaking to you on the purposes of the conference as seen by an individual industrialist.

Perhaps the issues can be definitized to some degree if I should say that the basic purpose of this conference, as I see it, is to exchange views on the following questions in the hope that sufficient agreement can be reached to serve as a guide for future action: Is there a mutuality of interest between the managers of industry and the managers of higher education? If the answer is in the affirmative, is this interest of sufficient importance to industry to justify the expenditure of corporate funds to further it? What kinds of education are best suited to meet the needs of industry? How can industry provide the help, financial and otherwise, needed by the colleges?

The dependence of industry upon higher education is amply evidenced by the systematic and thorough manner in which industry sends its "talent scouts" into the field each year to canvass the new graduates. The concept that industry can remain static for any appreciable period has long ago been outmoded. Our economy is in a state of dynamic equilibrium, like a man riding a bicycle. It must keep moving in order to remain in balance. And one of the most important measures by which it is kept in motion is the regular addition of qualified personnel to the organizational streams at their sources.

Thirty years ago American business was presided over in large part by men who did not have college training. Today the situation has changed markedly; business managers who are not college trained are in the minority. And business depends on higher education for its scientific and technical personnel even more than for those who are in the higher echelons of executive management. In brief, the dependence of business on higher education is too obvious to require extended demonstration.

The same might well be said for the dependence of higher education on business, whether or not such higher education is supported by government funds. The tax structure and the origin of tax monies have brought this about. Business supplies the tax base upon which government financial support for education is largely dependent. The basic function of business is to create and distribute material wealth. Without this, government (which in itself creates no wealth) would have insufficient revenues to support our institutions of higher learning.

The dependence on business of the universities and colleges which receive no government aid is even more obvious. Here again the tax laws play a major role. With personal taxes on the living, and inheritance taxes on the estates of the dead, increasing from year to year, *and* with little indication of prospective reductions, the former generous support of individuals for institutions of higher learning has largely withered away. So that private education, too, has been forced to turn to business corporations for sustenance.

With respect to the second question, namely, whether the support of higher education with corporate funds can be justified, granted a mutuality of interests, it is obvious that there will be varying degrees of justification for the extent of such support. Certainly, the direct payment by a corporation to a college for some specific research work could not be properly questioned by a shareholder. On the other hand, many shareholders would object to an endowment for general purposes for, let us say, a liberal arts college. They might say (as they have indeed said) that the work of the college serves only to increase the general cultural level of the community and this, in turn, would benefit the cor-

[1] Address to Industry-College Conference, White Sulphur Springs, W. Va., Nov. 12, 1953.

poration only indirectly, if at all; thus, no corporate contribution is justified.

The broad view is that the owners (*i.e.*, the shareholders) and the board of directors have delegated to management the responsibility for running the corporation in a manner that will assure its continued existence as a prosperous, growing business entity founded on a permanent and stable base.

While I agree that the shareholder is warranted in demanding that the support of education with corporate funds must be justified by demonstrating a direct benefit to the corporation from such expenditures, I hold that, since it is contemplated that there shall be no limitation on the longevity of the corporation, in like manner there should be no time limit placed on the beneficial returns from this type of investment.

On the whole, I would say that expenditures which are designed to preserve the governmental, social, and economic atmosphere in which private industry can continue to exist are far more important to the corporation than expenditures which serve only to produce more and better scientific craftsmen. The former can be amply justified on the basis of their long-range protective effects; the latter, on the basis of immediate needs.

The next question—"What kinds of education are best suited to meet the needs of industry?"—has received much attention from educators and from industrialists. It appears to be susceptible of simplification into this: Are men with specialized higher education better suited to meet the needs of business than those with broad cultural education?

I do not believe that there is a simple answer to this question. Much depends upon the needs of the particular business at the time under consideration. Certainly, it is true that there is a woeful dearth of men with broad cultural education who have talents which can be developed to enable them to occupy the highest places in management.

The result of this dearth is that often, in desperation, boards of directors select unqualified persons for top management, with the result that neither the corporation nor the person concerned has a very happy experience. One of my colleagues described this situation recently in these words: "When a great president retires, a vacuum is created. And into that vacuum is swept the nearest guy who hasn't had a coronary." And, in speaking of what his company looks for in employing young men, he said: "We employ them for their capacity to learn and seek knowledge, and their willingness and courage to undertake to learn."

I am thoroughly aware that while business in general speaks in a lofty vein of its need for young men with a broad cultural education, the performance of our recruiters in seeking highly specialized graduates leads to the conclusion that our tenet is more "honored in the breach than the observance." This is a situation which, I feel sure, will soon be corrected.

As a civil engineer who graduated from college 40 years ago, my belief is that I would have been much better equipped to meet the problems of life and to serve my employers if I had learned more about how to live, even at the cost of learning less about how to make a living—if I had been taught less about "material things" and more about "how to think."

It is, I believe, of utmost importance under today's conditions that we avoid educating young men and women in a vacuum. By this I mean that it is essential to the survival of our civilization that the student understand his relationship to our society as a whole, and that he be able and willing to play a responsible role in the social, economic, and political activities of our body politic.

In our own corporation we are finding it increasingly important that our prospective managers as well as our technical and scientific people have a knowledge of and interest in what goes on about them outside of the narrow field of their own interests and specialties. Perhaps to achieve this result it will be necessary to lengthen the period of higher education. Perhaps it can be achieved by less specialization in the sciences and greater emphasis on cultural fundamentals. That is a point on which an exchange of views in this conference could be very profitable.

With respect to the fourth question—"How can industry provide the help, financial and otherwise, needed by the colleges?"—I believe that the detailed agenda which has been pro-

vided by Dr. Carroll V. Newsom to each of the conferees indicates a wide variety of methods by which help can be given. This should enable any industrialist to furnish financial and other support to education in a manner to his own liking, provided that he has the *will* to do so.

It is interesting to note how many opportunities there are in the conduct of a corporate business to evade contributing to a worthy cause when the will to contribute does not exist. And, conversely, there are many ways for industry to contribute if the managers have convinced themselves that the contribution can be justified on the ground of corporate self-interest.

RESEARCH

MEN, EMOTIONS, AND JOBS[1]

By LOUIS J. CANTONI

General Motors Institute, Flint, Mich.

WHAT IS the relationship between emotional stability and occupational achievement? Our view regarding this question is necessarily tempered by the observations we have made and by our own feelings about jobs we have held.

This study aims to show how personal adjustment and occupational status were found to be related for a group of 94 male subjects. These men, who had attended a Flint, Mich., high school from 1939 to 1943, responded to a follow-up in 1952–53. The 94 had been members of an original group of 111 boys who had been selected at random from the school's male population. The total number of boys attending this school between 1939 and 1943 averaged a thousand.

Through the use of the *t* technique, it was established that the 94 respondents were comparable with the original group of 111 subjects on the basis of chronological age, high-school curriculum, grade-point average, scores on the Stanford Achievement Test, general intelligence, socio-economic background, and personal adjustment as revealed by the student form of the Bell Adjustment Inventory. Since about 10 years have elapsed between graduation and the follow-up, it seemed valid to assume that the responding subjects had had sufficient opportunity to establish themselves in representative jobs.

In the follow-up, the adult form of the Bell Adjustment Inventory was employed to measure the personal adjustment of the subjects. This test, comprised of a total of 160 *yes*, *no*, or *?* items, provides a score for total adjustment as well as sub-scores for five separate categories: (1) occupational, (2) social, (3) emotional, (4) health, and (5) home. For categories 1, 3, 4, and 5, high scores indicate poor adjustment; low scores, good adjustment. For category 2, high scores mean that the individual tends to be submissive and retiring in his social contacts; low scores evidence aggressiveness.

A five-point scale, originally known as the Taussig-Terman classification of the father's occupation, was used to measure the subjects' current occupational status. On this scale, jobs are given ratings as follows: (1) unskilled, (2) semi-skilled, (3) skilled, (4) business and managerial, and (5) professional and high executive.

TABLE 1

MEANS, STANDARD DEVIATIONS, AND COEFFICIENTS OF CORRELATION FOR 94 MALE HIGH-SCHOOL GRADUATES

	Mean	S.D.	*r* with occupational status
Occupational Status	3.37	1.15	
Bell Adjustment Inventory ...	28.86	21.15	−.32
Occupational Adjustment ..	6.05	5.71	−.32
Social Adjustment	8.83	6.34	−.30
Emotional Adjustment	5.04	5.16	−.27
Health Adjustment	4.20	3.72	−.27
Home Adjustment	5.09	5.64	−.15

The correlations in Table 1 appear as negative because there is an inverse relationship between the Bell test (where low scores indicate superior adjustment) and the occupational status scale (where high ratings indicate superior status).

[1] The author is indebted to James E. Boyce and Harry E. O'Neill, Jr., of General Motors Institute for their valuable suggestions.

With the exception of the last category, all of the correlations yielded coefficients significant at better than the one per cent level, showing that a valid positive relationship exists between the two variables. Another way of expressing this is to say that the subjects who scored better on the personality test were also inclined to score higher on the occupational scale.

An effort was made to determine the causal direction in the relationships demonstrated by the *r*'s in Table 1. The problem, then, becomes one of proving the following hypothesis: If personal adjustment improves as higher job status is attained, then those subjects whose personal adjustment has improved since graduation from high school should have reached superior job levels.

A measure of change in adjustment was obtained from a comparison of scores on the student form of the Bell Adjustment Inventory (administered in the 12th grade) with scores on the adult form (administered in the follow-up). The student and adult forms of the inventory, though different tests, are considered equivalent. The result of the comparison was an *r* of .43, which was significant at better than the one per cent level. However, since test-retest reliabilities on both student and adult forms are generally much higher than this, it was concluded that most of the men had experienced change in their personal adjustments.

By noting the change in total scores for each man on the two administrations of the Bell test, the writer made a tally which separated the subjects into those whose measured personal adjustment had changed in a favorable and in an unfavorable direction. To test the relationship between job status and improvement in personal adjustment, the two variables were entered into a four-by-two table. The comparison yielded a chi-square of 10.273, significant between the one and two per cent levels with three degrees of freedom. This would seem to indicate that occupational status clearly affected the personal adjustments of the subjects.

Assuming that the Bell Adjustment Inventory is a valid measure of personal adjustment, and the Taussig-Terman classification constitutes an adequate measure of job levels achieved by the subjects, it can be concluded that the subjects who described themselves as well adjusted on the personality test also tended to report higher job status on the occupational scale. This means that an individual's personal adjustment affects the occupational level that he is able to attain.

However, the 94 graduates experienced considerable change in personal adjustment after they left high school. This was established by the size of the coefficient of correlation for the comparison of scores on 12th-grade and follow-up administrations of the Bell Adjustment Inventory. Thus, the possibility was raised that job status might have had a marked effect on personal adjustment. Inquiry revealed that as job status got higher, there was concomitant improvement in personal adjustment. Lower job status, on the other hand, was accompanied by lack of such improvement. This finding appears to support the conclusion that occupational status has a decided influence upon personal adjustment.

CORRESPONDENCE

The Implications of President Kirk

PRESIDENT GRAYSON KIRK (SCHOOL AND SOCIETY, Nov. 13, 1954) draws a distinction between the responsibilities of "character building" and the "training of the mind"—the first of which he allocates as the primary responsibility of the home, and the second, of the school. In charging the home, with its "intellectual fare of comic books, television sets, and picture magazines" for our moral deterioration, he implies a Jobian exoneration of the schools because, "no school can offset the evil influence of a home with low moral, disciplinary, and intellectual standards." This kind of exoneration places the school in a rather hopeless and humble position, for this function of offsetting and altering decadent influence in the social environment is

the very hope and goal of our American school system; to wage battle against evil, ignorance, and prejudice. Surely, it is by now axiomatic that the school and home must work mutually and reciprocally, but it has always been creedal that the school must serve creatively and reconstructively in fashioning the values and patterns of our civilization.

But, even more disturbing, is President Kirk's distinction between "character building" and "training the mind." This may be good logical classification, but it is not realistic psychology. There are, of course, such processes as achieving certain insights, learning certain patterns of conscious thought, developing conscious criteria of appreciation and selection; there are also such processes as learning to act in accordance with certain values, learning to respond in accepted ways to needs and emotions, developing certain habits of indulgence in human relationships, and the like. But, to attempt today to precipitate such an integrity as mind, except as a tabloid of folk expression, is hardly serious. Mind and character are aspects of a unified personality and one cannot accept the job of ministering to one and allocating the ministration of the other to some other agency.

President Kirk refers to "the esoteric jargon" of some educators. Perhaps he means precisely the kind of language in the paragraph above. It is curious that some of us recognize the need of technical terminology in medicine, law, engineering, theology, and even literary criticism, but ridicule its employment in education. We refuse to concede that education is the enterprise of employing all possible human resources in the direction, elevation, and control of human behavior. If this is so, it becomes necessary for members of the profession to exchange and communicate concepts which can best be expressed in technical verbalisms. This kind of "esoteric jargon" is as much a need in education as in engineering or theology. President Kirk is especially annoyed by the term, "group dynamics," and yet the notion of "group dynamics" is one of the most fertile concepts of modern social psychology, and surely social psychology is part of what President Kirk terms the "stuff of education."

President Kirk then discusses the disturbing and fantastic statistics of educational resources, and suggests more money, more buildings, and higher salaries. Most curiously of all, he suggests that, if people would stop gossiping about teachers' private lives, beliefs, and activities, such an elevation of teacher-status would take place that the teacher shortage would be solved.

This is totally inadequate, and we will have to think through problems like the following: Can education be operated in community areas other than school buildings? Can the pattern of one teacher to 25 pupils in a classroom be changed? Can the classroom recitation method give place to something more ample and comprehensive? Can plans of teacher-training, certification, and programs be changed? In certain situations can teachers be employed part-time as they are in medical schools? Can curriculums be reorganized so as to center about certain basic factors or cores? Such problems apparently President Kirk has either not thought about, or concerned himself with, or failed to mention.

President Kirk implies that the school would be better off if it detached its responsibility from the community; relinquished its concern with moral, political, social, and educational goals; and rather stubbornly insisted upon restricting itself to "training the mind." President Kirk can conceive this quite easily. It is not so easy for the teacher who daily meets face to face the products of social, moral, and political deterioration; the teacher who must accept children whose conduct stems from every type of personality disorder and cannot go about "training their minds." Children who hate, fear, plan delinquency, are unhappy, neglected, whose intelligence is thwarted by emotional shocks cannot be handled by techniques of intellectual discipline. President Kirk must see such children face to face; otherwise, this becomes "esoteric jargon."

At this point President Kirk offers the inevitable panacea—"serious work," "intellectual discipline," and "mental horizons." He deplores the vocational, practical spirit that has infiltrated education, forgetting that Shakespeare's plays, for instance, were the result of the author's vocational talents.

According to President Kirk's thinking, learning is an unpleasant experience; hence, we must be driven to it by some kind of compulsive discipline. (The fact is that learning is a natural process of growth and maturity.) The human

spirit is "enriched" by occupation with a certain content of reading and study called the "liberal arts." (The fact is that the human spirit is enriched when a person gains insight into his role in human life.) We should pay less attention to method and more to content in education. (The fact is that "method," in its best sense, is that pattern of learning experience that makes for the best development of man.) We must educate the "gifted child" for leadership. (The fact is that all children must be educated for a co-operative participation in a democratic life. The Germans tried what President Kirk had in mind.)

Perhaps one of the most pathetic fallacies in President Kirk's implications is that there is a corpus of learning which can be mentally swallowed as a tonic to the human spirit. This is just not true. There is no corpus of learning inherently possessing such magical properties—whether Greek dramas, modern architecture, or labor problems. Education is the process of insight into, and control over, one's self in relation to the problems of mankind. What is important is not the material content, but rather what President Kirk discounts as method—that is, the entire pattern, climate, and satisfaction of the learning process.

LEON MONES
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Newark, N. J.

EVENTS

Leadership, the Rod, and Education

MANY HAVE doubtless rubbed their eyes in amazement when they read news reports of the two Sachs lectures delivered Nov. 22–23, 1954, at Teachers College, Columbia University, by Field Marshal Viscount Bernard Montgomery. The surprise was probably not so much the fact of a military man lecturing to the faculty and students of one of the world's greatest pedagogical centers, but rather the sensational content of the talks.

In the first place, Viscount Montgomery, as reported in the press, criticized the basic principles underlying public education in the United States while endorsing his native country's system. From the mouth or pen of an American professor, academician or even educationist, this would be rank heresy. It takes but little imagination to guess at the consequences—the branding of the speaker as an "enemy" of public education and as an opponent of democracy, the publication of an avalanche of defense articles and letters-to-the-editor, and the organization of a nation-wide campaign to pillory the poor professor and to separate him possibly from his position. All these things have occurred in recent years, but the reception to Montgomery's lectures on "Education for Leadership," perhaps in deference to the dictates of hospitality and international courtesy, appeared to be extraordinarily mild.

This is strange, particularly in view of the explosive, or at least provocative, statements made by the field marshal. A few might be quoted: "If the right of the well-endowed to lead is denied—the well-endowed with ability, not the well-endowed with dollars—or if we fail to give them proper training, then the rich or the well-born or the demagogues or the toughs will become the leaders"; "there is no justification for sacrificing the clever minority to the duller majority"; "a good beating with a cane can have a remarkable sense of awakening on the mind and conscience of a boy"; and "not to administer such chastisement in bad cases is in effect a sort of cruel neglect—cruel to the child and cruel to society." There is no need to cite at length the contrary opinions of the vast majority of educators, psychiatrists, psychologists, and the like.

Consider the question of corporal punishment, or caning, as it is termed more familiarly by the British. By and large, modern educators, PTA leaders, and many others concerned with the guidance and rearing of children would react with horror to Montgomery's blunt suggestion in favor of the rod. In all probability they

would rather endorse A. S. Neill's statement that "the child's chief aim in life is to be loved, and every spank, every moral lecture, every frown means to the child that he is not loved." This is the impression one gets from reading books and articles and from listening to speeches. On the other hand, a Gallup Poll in the same month appeared to give another outlook on the problem. This survey indicated that 55% of American parents think that school officials should have the right in serious cases to give pupils a "licking." Obviously, there is a gap between leadership and followership in this instance.

It is good that offbeat educational views such as expressed by Viscount Montgomery have been given an airing by an institution long identified with a totally differing educational philosophy. When these lectures see print and become available to a wider audience, the ideas therein may get greater consideration. Teachers College thus continues the tradition of promoting controversial thinking in education, a tradition to which more schools of education seem to pay labial homage than to follow in actual practice.—W. W. B.

FELLOWSHIPS FOR INTERNATIONAL STUDIES

THE SCHOOL of Advanced International Studies, Johns Hopkins University, offers graduate fellowships for specialized study in international affairs in a co-ordinated program of studies in diplomacy, international law, international economics, the political and economic characteristics of special areas, and intensive work in foreign languages. College graduates whose backgrounds include training in economics, history, and political science, as well as in at least one modern foreign language, may apply. Only U. S. citizens are eligible for these competitive awards.

Also offered are fellowships for specialized study at Bologna, Italy, in a co-ordinated program of studies in law, economics, and politics as related to Austria, France, Germany, and Italy. The faculty is composed of distinguished American and European scholars. College graduates whose backgrounds include training in economics, history, and political science, as well as in at least one European language, may apply. Information and forms are obtainable from the School of Advanced International Studies, 1906 Florida Ave., N. W., Washington 9, D. C. Applications must be received not later than March 1, 1955.

FELLOWSHIPS FOR HIGH-SCHOOL TEACHERS

THE FUND for the Advancement of Education offers some 200 fellowships for the academic year 1955–56 to high-school teachers to strengthen secondary-school teaching and to stimulate widespread consideration of the purposes, the means, and the ends of liberal studies in secondary education. Each recipient will spend a full academic year away from the classroom to extend his own liberal education and to improve his teaching ability. Eligibility for these fellowships is limited to teachers who have devoted at least half time to classroom teaching in each of the past three academic years and who are not more than 50 years of age as of Jan. 1, 1955. Fellowships are available in the humanities, the social studies, and the natural sciences. The amount of the fellowship award will take into account the regular salary the teacher would receive during the school year and reasonable allotments for certain other expenses.

Application material is available from superintendents in all high-school districts throughout the country. Additional forms may be obtained from the National Committee on High School Teacher Fellowships, Fund for the Advancement of Education, 655 Madison Ave., New York 21. Individual applicants should *not* apply to the National Committee but to their superintendent of schools. Applications must be received by the national committee not later than March 15, 1955.

A DOCTORATE IN MUSICAL ARTS

A NEW DOCTORAL program in musical arts is now offered at the University of Illinois for composers and musical artists desiring professional advancement in the academic world. This program enlarges the present graduate work in music to include composition and performance as well as research and music education. Candidates for the degree must demonstrate artistic competence either by writing a large-scale musical work or by outstanding public performances.

In addition, a thesis reporting independent research on a topic related to the major activity of the candidate will be required.

INTERNATIONAL TRAVEL OPPORTUNITY

THE COUNCIL ON STUDENT TRAVEL, 179 Broadway, N. Y. 7, invites applications for short-term employment as educational directors on trans-Atlantic ships. Required: specialists in cultural anthropology, art history, international relations and economics, group work, language, philosophy, recreation, and sociology. Conversational ability in one or more of the following: French, German, Greek, Italian. Ability to organize extensive educational program with the help of passenger volunteers. From March to Dec., 1955, the program will be conducted by the council for students, tourists, and migrants traveling aboard two large passenger ships belonging to one of the major lines. These ships sail regularly from New York to European and Mediterranean ports. Job assignments vary from one round-trip sailing to periods of three to five months. Compensation for these longer periods of service will be regular salary; for a single round-trip sailing, full and partial passage, depending upon job requirements. All positions allow for time abroad.

Notes and News

Appointments, Promotions, Resignations, Retirements

C. Leslie Major, assistant professor of education, Denison University (Granville, Ohio), appointed assistant to the president for development.

James L. Zwingle, president, Park College (Parkville, Mo.), will become vice-president, Cornell University, effective July 1.

The Rev. Sterling F. Wheeler, director, Texas Methodist Student Movement, appointed vice-president in charge of development and public relations, Southern Methodist University (Dallas, Tex.).

Philip E. Bunker and Thomas W. Palmer, Jr., named vice-president for administrative affairs and co-ordinator of Latin-American studies, respectively, Boston University.

Paul G. Bulger, associate professor of education, Teachers College, Columbia University, will serve as acting provost of the college until July 1, when he will succeed Milton C. Del Manzo as provost. Ishtiaq Husain Qureshi, former minister of education, Pakistan, appointed visiting professor of history, Near and Middle East Institute, at the university.

Marion Wade Doyle, former president, Board of Education, Washington, D. C., appointed conference representative for organizations, White House Conference on Education.

Recent Deaths

Elizabeth Cutter Morrow, 81, acting president, Smith College (Northampton, Mass.), 1939–40, Jan. 23.

William R. LaPorte, 65, retired head, department of physical education, University of Southern California (Los Angeles), Jan. 14.

William H. Beyer, 58, dramatist, critic, and contributor of review articles on the state of the theater to SCHOOL AND SOCIETY, Jan. 19.

Robert P. Tristram Coffin, 62, Pulitzer Prize-winning poet and Pierce Professor of English, Bowdoin College (Brunswick, Me.), Jan. 20.

RECENT Publications

ALLPORT, GORDON W. *The Nature of Prejudice.* Pp. 537. Beacon Press, Boston 8. 1954. $7.00.

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ANDERSON, HOWARD R. (editor). *Approaches to an Understanding of World Affairs.* Pp. 478. National Council for the Social Studies, NEA, Washington 6, D. C. 1954. Paper, $3.50; cloth, $4.00.

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A Policy for Skilled Manpower. Pp. 299. Columbia University Press, New York 27. 1954. $4.50.

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BATHURST, EFFIE G., AND JANE FRANSETH. *Following Graduates into Teaching.* Pp. 45. U. S. Office of Education, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 1954. 25 cents.

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BELL, MARGUERITE N. *With Banners: A Biography of Stella L. Wood.* Pp. 163. Macalester College Press, St. Paul, Minn. 1954.

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BOCK, EDWIN A. *Fifty Years of Technical Assistance: Some Administrative Experiences of U. S. Voluntary Agencies.* Pp. 65. Public Administration Clearing House, Chicago 37. 1954. $1.50.

BUTLER, KENNETH B., GEORGE C. LIKENESS, AND STANLEY A. KORDEK. *101 Usable Publication Layouts,* pp. 112; BUTLER, KENNETH B., *Practical Handbook on Effective Illustration in Publication Layout,* pp. 82; Butler Typo-Design Research Center, Mendota, Ill. Both 1954 editions and $3.75 each.

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CHEEVER, DANIEL, AND H. FIELD HAVILAND, JR. *Organizing for Peace.* Pp. 917. Houghton Mifflin Co., Boston. 1954. $7.00.

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CHITTY, JR., ARTHUR BENJAMIN. *Reconstruction at Sewanee: The Founding of the University of the South and Its First Administration, 1857–1872.* Pp. 206. University Press, Sewanee, Tenn. 1954.

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CLEMONS, HARRY. *The University of Virginia Library, 1825–1950: Story of a Jeffersonian Foundation.* Pp. 231. Illustrated. University of Virginia Library, Charlottesville. 1954. $5.00.

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COOPER, JAMES FENIMORE, *The Deerslayer,* edited and adapted by Marjorie Holmes, pp. 135, $2.00; DANA, RICHARD HENRY, *Two Years Before the Mast,* adapted by Murray E. Satz, pp. 275, $2.00; DICKENS, CHARLES, *Nicholas Nickleby,* edited and adapted by Salibelle Royster, pp. 229, $2.40; SPER, FELIX (editor), *Living American Plays,* pp. 454, $3.00. Globe Book Co., New York 10. All illustrated and 1954 editions.

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CRAWFORD, JOHN, AND DORATHEA. *Milestones for Modern Teens.* Pp. 190. Whiteside, Inc., & William Morrow & Co., New York 16. 1954. $3.00.

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CUNNINGHAM, JR., ROBERT M. *The Challenge to Medical Education.* Pp. 28. Public Affairs Committee, New York 16. 1954. 25 cents.

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Developing Programs for Young Adolescents, pp. 53, 1954, $1.00; *Education for American Freedom,* pp. 58, 1954, $1.00; REED, CALVIN H. (editor), *Selected Bibliography for Curriculum Workers,* pp. 29, 1954, $1.00. Association for Supervision and Curriculum Development, NEA, Washington 6, D. C.

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EDWARDS, ALLEN L. *Statistical Methods for the Behavioral Sciences.* Pp. 542. Rinehart & Co., New York 16. 1954. $6.50.

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ELLISON, RHODA C. *History of Huntingdon College, 1854–1954.* Pp. 305. University of Alabama Press, University, Ala. 1954. $4.00.

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FINK, RYCHARD. *American Democracy in Mid-Century: A Bibliography of Recent Books in the American Tradition.* Pp. 85. Interstate Publishers, Danville, Ill. 1954. 60 cents.

GLENNON, VINCENT J. (editor). *Frontiers of Elementary Education, I.* Papers presented at the First Annual Conference on Elementary Education, Syracuse University, 1954. Pp. 120. Syracuse University Press, Syracuse, N. Y. 1954. $1.75.

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HESTER, KATHLEEN B. *Teaching Every Child to Read.* Second edition. Pp. 416. Harper & Bros., New York 16. 1955. $4.00.

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HOPKINS, THOMAS W., *et al. Evaluation and Education of the Cerebral Palsied Child: New Jersey Study.* Pp. 114. Illustrated. International Council for Exceptional Children, Washington 6, D. C. 1954. $1.60; quantity rates.

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HUTCHINS, CLAYTON D., ALBERT R. MUNSE, AND EDNA D. BOOHER, *Federal Funds for Education, 1952–53 and 1953–54,* pp. 130, 1954, 45 cents; *Statistics of Libraries in Institutions of Higher Education, 1951–52,* pp. 60, 1954, 25 cents. U. S. Office of Education, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

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XVII International Conference on Public Education, 1954, No. 159, pp. 148, 1954, 4 Swiss francs; *Secondary Teachers' Salaries,* No. 157, pp. 292, 1954, $2.00; *Secondary Teacher Training,* No. 155, pp. 202, 1954, $1.75. Unesco, International Bureau of Education, Geneva, Palais Wilson.

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Junior Colleges and Specialized Schools and Colleges. Second edition. Pp. 336. Porter Sargent, Boston 8. 1955. Cloth, $3.30; paper, $3.20.

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LEARSI, RUFUS. *The Jews in America: A History.* Pp. 382. Illustrated. World Publishing Co., Cleveland 2, O. 1954. $6.00.

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LEE, RAYMOND L., JAMES A. BURKHART, AND VAN B. SHAW. *Contemporary Social Issues.* Pp. 864. Thomas Y. Crowell, New York 16. 1955. $3.95.

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VINTON, IRIS (editor). *Summary of Junior Book Awards Reading Program, 1954.* Pp. 90. Illustrated. Boys' Clubs of America, New York 16. 1954. 25 cents.

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